

REMARKS

In response to the Final Office Action mailed on February 23, 2004, Applicants respectfully request reconsideration. Applicants would like to thank the Examiner for the interview held on April 21, 2004 to discuss distinctions between the pending claims and cited prior art. The following discussion of patentability is consistent with this interview. Allowance of the pending claims is respectfully requested.

Applicants have amended claims 1, 5, 6 and 16 in accordance with the Examiner's suggestions and are appreciative of the Examiner's efforts to further prosecution of the present application. The following remarks address the rejections of claims 1-24 as set out in the Final Office Action.

Rejections of Claims 1-24 under 35 U.S.C. § 112

The Office Action includes a rejection of claims 1-24 under 35 U.S.C. §112, paragraph 1. In accordance with the Examiner's suggestion, Applicants have modified claim 1, 14, and 16 to recite an "object request broker" in lieu of an "object-oriented dynamic linking mechanism." Support for the amendment can be found in the specification at page 5, lines 5-18 as well as corresponding figures.

Rejections of Claims 1-7, 9-14, and 16-20 under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-7, 9-14, and 16-20 under 35 U.S.C. § 103(a) based on the teachings of Weber, et al., (U.S. Patent 6,480,901) in view of Axberg (U.S. Patent 6,253,240). In summary, the Office Action cites Axberg for disclosing an object-oriented dynamic linking mechanism and Weber for disclosing the balance of limitations in claims 1 and 16.

The Office Action contends that items 112 and 114 (namely, I/O management station and DMI management station) in FIG. 1 of Weber are

equivalent to the "management servers" as recited in the claimed invention. The Office Action also contends that client 902 and client 910 in FIG. 9 of Weber are equivalent to the "one or more clients" as recited in the claimed invention.

Consistent with the discussion on April 23, 2004, Applicants respectfully submit that claim 1 includes limitations not taught or suggested by Weber or Axberg. More specifically, claim 1 recites i) "a plurality of host computers connected to the storage system through a first communications network, each host computer including at least one agent for transmitting data to and retrieving data from one for more of the plurality of storage devices," ii) "one or more storage management servers in communication with each of the plurality of host computers via its agent", iii) "one or more clients independent of the storage area network, the one or more storage management servers being adapted to connect to the one or more independent clients via a web-based second communications network", and iv) "the one or more storage management servers providing information received from an agent and relating to an operation status of the storage devices to the one or more independent clients via the second communications network." Thus, according to claim 1, the one or more storage management servers receive operation status information of the storage devices based on communications with the agents at the plurality of host computers. The one or more storage management servers provides the operation status information over a second communications network to the one or more clients.

Applicants respectfully submit that the claimed invention is distinguished over Weber. For example, Weber does not teach or suggest a management server disposed to collect information from agents and distribute the information over a network. Weber, in FIG. 1, discloses an I/O management station 112 that discovers I/O devices such as a RAID storage system and the like. FIG. 5 of Weber further illustrates how management station 510 and, more specifically, storage array management applet 518 displays the current state, states and

configuration of a corresponding storage device to a user (column 9, lines 54-67). In other words management station 510 runs different storage array management applets (i.e., clients) to create volumes on a storage system. This is more particularly shown in FIG. 9 of Weber. Thus, a user at I/O management station 112 can display appropriate information associated with a storage system. Referring again to FIG. 5 in Weber, the I/O management station 112, 510 can receive event notifications from a device connected to server 508 (column 11, lines 5-13).

In contradistinction to Weber, claim 1 recites a management server disposed between the host computer (having corresponding agents) and the clients. As its name suggests, the management server provides management functions as well as server functions. For example the management server manages by receiving operation status information from the agent at host computers and serves by disseminating the operation status information via an object request broker to the clients over a second network. Note again that the office action likens the management server in the claimed inventor to the I/O management station 112 in Weber. Applicants would like to point out, however, that the management station 112 in Weber does not provide operation status information to remotely located clients over a network.

One aspect of the claimed invention is to provide clients operation status information associated with remote storage devices, e.g., over a web-based network such as an Intranet. Typically, storage systems are quite large requiring different users of a system to have different responsibilities with respect to objects stored in the storage devices. As discussed in the summary of the subject application, the network architecture of the present invention facilitates distribution of these responsibilities.

According to the cited network architecture in claim 1, distribution of the operation status information is transparent to the clients. For example, host computers (likened to server 122 or server 508 in Weber) coupled to corresponding storage devices include agents for gathering operation status information associated with the storage devices. The agents of the host computers forward the operation status information to one or more management servers that, in turn, disseminate the operation status information to the one or more clients. Thus, the one or more clients receives the operation status information from a management entity (i.e., the one or more management servers) dedicated for collecting the operation status information from multiple host computers. Otherwise, as would be required by the other references, each of the one or more clients would have to individually communicate with the host computers to retrieve the operation status information, which would result in high volumes of traffic to the host computers thus causing congestion. For example, based on conventional techniques, a first client would have to communicate with each of the host computers associated with the storage devices to collect information, a second client would also have to communicate with each of the host computers associated with the storage devices to collect information, and so on. Instead, as recited in claim 1 and in contradistinction to the cited art, the one or more management servers provides the clients with the operation status information alleviating congestion at the host computers. Note that none of the cited references, individually or combined, teaches or suggests this configuration of offloading the collection of operation status information to a management server that collects the operation status information based on communication with agents at the host computers associated with the storage devices.

Applicants respectfully submit that the invention as recited in amended claim 1 is neither anticipated nor obvious because it includes a unique and advantageous configuration not taught or suggested by Weber and/or Axberg or any other reference of record. Thus, in view of the foregoing discussion,

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Applicants submit that amended claim 1 is patentably distinct and advantageous over the cited prior art, and the obviousness rejection should be withdrawn. Accordingly, allowance of claim 1 as well as corresponding dependent claims 2-15 and claims 21-22 is respectfully requested. If the rejection of claim 1 is to be maintained, Applicants respectfully request that the Examiner point out with particularity where the cited prior art discloses a configuration as recited by claim 1.

Claim 16 includes similar limitations as recited in claim 1 above. For example, claim 16 recites "providing a storage management server between one or more of the independent clients and the plurality of storage devices." Thus, claim 16 also includes distinguishing limitations not cited in Weber or Axberg. For applicable reasons as discussed above, claim 16 and corresponding dependent claims 17-20 and 23-24 are patentably distinct over the cited prior art.

Applicants would like to point out that the pending dependent claims further distinguish the claimed invention over the cited prior art. For example, claim 2 recites "wherein the storage management server includes: a poller for gathering the information relating to the operation status of the storage device; a central repository for storing the information relating to an operation status of the said one of storage devices; and an object server for distributing the information relating to the operation status of the storage devices to the clients." The Office Action rejects claim 2 under 35 U.S.C. § 103(a) based on the additional teachings of Axberg.

Applicants would like to point out that Axberg does not teach a management server. Furthermore, Axberg does not teach or suggest a management server that includes a poller, a central repository, and an object server. More specifically, Axberg utilizes one of the host computers to function as a storage network manager, while other computer systems in the network

function as agents of the network manager (column 6 line 65 to column 7 line 4). The Office Action likens the object server of the present invention to the storage network manager. Applicants contend that the storage network manager at the host computer does not act as “an object server for distributing the information relating to the operation status of the storage devices to the clients” as in the claimed invention. Instead, as recited in Axberg at column 9 line 50 to column 10 line 10, the network manager supports planning functions and monitoring function. The planning functions do not include serving information gathered from agents to corresponding clients. Thus, Axberg does not recite limitations of claim 2.

Claim 5 recites “wherein the storage management server further provides information relating to an operation status of storage connectivity devices which connect storage devices to the host computers.” The Office Action rejects claim 5 under 35 U.S.C. § 103(a) based on the additional teachings of Axberg.

Applicants would like to point out that Axberg does not teach a management server as discussed above. Furthermore, Axberg does not teach or suggest a management server that provides the clients information relating to an operation status of storage connectivity devices which connect storage devices to the host computers. For example, the storage manager in Axberg causes a display to change in response to the occurrence of an event. This is not equivalent to or suggestive of providing, over a second network, the clients information relating to an operation status of storage connectivity devices. Thus, Axberg does not recite limitations of claim 5.

Claim 6 recites “a poller for gathering the information relating to the operation status of the storage device and storage connectivity devices; a central repository for storing the information relating to the operation status of said one of the storage devices and storage connectivity devices; and an object server for

distributing the information relating to an operation status of the storage devices and storage connectivity devices to the clients." The Office Action rejects claim 6 under 35 U.S.C. § 103(a) based on the additional teachings of Axberg.

Applicants would like to point out that Axberg does not teach a management server as discussed above and as recited by claim 6. Furthermore, Axberg does not teach or suggest a management server including an object server for distributing the information relating to an operation status of the storage devices and storage connectivity devices to the clients. For example, the storage manager in Axberg implements an object-oriented programming code to network configuration and display network configurations (column 9, lines 52-67 and column 10, lines 1-18 as cited by the Examiner). This is not equivalent to or suggestive of distributing, over a second network to the clients, the information relating to an operation status of the storage devices and storage connectivity devices. Thus, Axberg does not recite the limitations of claim 6.

Claim 13 recites "comprising a plurality of storage management servers, each connected between the host computers and the plurality of clients, each storage management server, providing information relating to an operation status of said one of the storage devices to at least one of the clients." The Office Action rejects claim 13 under 35 U.S.C. § 103(a) based on the same rational of the rejection of claim 1.

Applicants would like to point out that Weber also does not teach a plurality of management servers as recited by claim 13. Furthermore, Axberg does not teach or suggest a plurality of management servers, each connected between the host computers and the plurality of clients, each storage management server, providing information relating to an operation status of said one of the storage devices to at least one of the clients. The Office action contends that claim 13 is substantially the same as claim 1. Applicants

respectfully disagree. Use of a plurality of management servers enables the distribution of management tasks to multiple management servers instead of a single management server. This useful feature of the claimed invention is neither taught nor suggested by Axberg or Weber. Thus, Axberg and Weber neither individually nor combined recite the limitations of claim 6.

Applicants would again like to thank the Examiner for the interview held on April 21, 2004 to discuss distinctions between the pending claims and cited prior art. Allowance of the pending claims is respectfully requested.

CONCLUSION

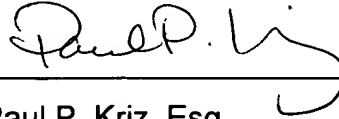
In view of the foregoing remarks, all claims of the subject application are in condition for allowance. A notice to this affect is respectfully requested. If the Examiner believes, after this Response, that the Application is not in condition for allowance, the Examiner is respectfully requested to call the Applicants' Representative at the number below.

Applicants hereby petition(s) for any extension of time which is required to maintain the pendency of this case. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50-0901.

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If the enclosed papers or fees are considered incomplete, the Patent Office is respectfully requested to contact the undersigned Attorney at (508) 366-9600, in Westborough, Massachusetts.

Respectfully submitted,



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